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HIGHER EDUCATION SOLUTIONS NETWORK - QUARTERLY REPORT

Massachusetts Institute of Technology—MIT
Comprehensive Initiative on Technology Evaluation (CITE)
AGREEMENT NO. AID-OAA-A-12-00095

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Acronyms

CITE	Comprehensive Initiative on Technology Evaluation
CTL	Center for Transportation and Logistics
DUSP	Department of Urban Studies and Planning
ESD	Engineering Systems Division
HESN	Higher Education Solutions Network
IDC	International Development Conference
IDIN	International Development Innovation Network
IST	Information Services and Technology
MIT	Massachusetts Institute of Technology
M&E	Monitoring and Evaluation
OAA	Office of Acquisition and Assistance
OSP	Office of Sponsored Programs
PSC	Public Service Center
RA	Research Assistant
SSRC	Sociotechnical Systems Research Center
SUTD	Singapore University of Technology and Design
TA	Teaching Assistant
UNICEF	United Nations Children's Fund
UROP	Undergraduate Research Opportunities Program
USAID	United States Agency for International Development
WFP	World Food Programme

Executive Summary

This Quarterly Report details CITE's Year One, Quarter Two (Y1Q2) objectives, activities and results. Y1Q2 objectives focused primarily on creating and sustaining the environment within which CITE's faculty, staff and students can achieve the program goals, while at the same time taking steps towards developing CITE's evaluation methodology. The highlight for Y1Q2 was the commencement of the CITE Seminar: ESD.S20/11.S941: Evaluating Technologies for the Developing World, with 24 student membership. During Y1Q2, CITE continued to lay the groundwork for a fruitful year in which faculty, staff and students began to shape and test CITE product evaluation methods. We also continued our engagement with our development organization partners to seek possible internships, fellowships and field test sites for our students for Summer 2013. We engaged USAID in finalizing our Workplan and developing our Monitoring and Evaluation Plan; recruited and hired a Finance/Program Manger to assist in managing and forecasting CITE resources and coordinating finances across internal CITE partners; and hired a Monitoring and Evaluation Coordinator to create a M&E Plan in coordination with USAID. More specifically, Y1Q2 milestones included:

1. Commencement of ESD.S20/11.S941: Evaluating Technologies for the Developing World;
2. Submission of Workplan;
3. Recruitment and hiring of Finance & Program Manager and Monitoring & Evaluation Coordinator;
4. Recruitment and hiring of graduate student Research Assistants and Teaching Assistant;
5. Development of initial set of indicators for CITE program that corresponds to HESN objectives and intermediate results (IR);
6. Creation of the CITE-PSC's USAID Community Partner Interns and USAID Program Development Fellowships;
7. Creation and recruitment of the "CITE Sustainability Team Advisors";
8. Recruitment of an additional faculty to the Sustainability Team; and
9. Exploration of CITE Hub at Singapore University of Technology and Design.

In the coming quarter (Y1Q3), CITE plans to build upon these activities by refining and resubmitting a first year program budget that better aligns with first year activities, building an online presence, formalizing our working agreement with our development organization partners, building a database of products for the development world, preparing for a high-level USAID-MIT meeting that includes a talk by Dr. Alex Dehgan, USAID on May 13, 2013 ("The Future of Science & Technology in International Development") to the entire MIT community, and preparing our students to go on CITE fellowships, internships and field product testing. Beyond these foundational activities, CITE will work with the International Development Innovation Network (IDIN) to leverage the USAID cooperative agreements into a larger, campus-wide initiative for international development research at MIT in partnership with USAID, MIT Senior Administration, MIT Resource Development

Part 1: Major Milestones and Events Completed

1.1. Milestones

Responsible financial and program stewardship is a top priority for the CITE management team. As such, CITE management hired a Financial and Program Manager on February 13, 2013 to assist with financial tracking and reporting, assist in budget development, and coordinate across all departments within CITE. A Monitoring and Evaluation Coordinator was also hired to develop an M&E plan and monitor the progress of the program according to the indicators that will be selected and agreed upon with USAID. A shop manager was also hired to help the students in the ESD.S20/11.S941 seminar in testing and evaluating products. Recruiting high-quality students also remains a priority (RA duties Attached as Appendix III and IV). . CITE faculty and staff have hired six graduate students to promote participation in the program through a semester-long research assistantship and through the CITE spring semester ESD.S20/11.S941: Evaluating Technologies for the Developing World class, of which one graduate student has been designated to be the teaching assistant for the class.

The ESD.S20/11.S941: Evaluating Technologies for the Developing World class commenced on February 11, 2013 with 24 total participants, of which nine are non-registered students (Attached as Appendix I course syllabus and Appendix II: student membership). The weekly seminar meets on Mondays from 3:30pm to 5:00pm, with occasional additional discussion sessions. This seminar serves as a forum for developing and testing CITE's 3S (Suitability, Scalability, Sustainability) product evaluation methodologies and for engaging with USAID and other development organizations to refine and implement those methods.

In preparing for summer programming, CITE and the Public Service Center (PSC) announced a call for applications for USAID Community Partner Interns and USAID Program Development Fellowships (http://web.mit.edu/mitpsc/whatwedo/cite-psc/index.html), receiving over 20 applications to date.

The suitability team has identified several areas for future research, several of which were brought to the fore in the class. These include:

1. The testing of well-developed commercial products vs. evaluation of prototypes or products in development.
2. The methods used to select products to evaluate as part of the CITE program given limited resources.
3. Soliciting expert feedback and building consensus in technical decision making

The team has selected several research assistants, both current students and incoming students, to develop the literature reviews needed to support rigorous research in these areas. We anticipate writing papers on existing methods for product evaluation, modifying those methods to the developing world context and on soliciting expert opinion in technical decision making will form the basis for our method going forward.

The Sustainability Team recruited Dr. Richard Schuhmann, a Senior Lecturer/Short Subject Program Manager in the Gordon-MIT Engineering Leadership Program as a voluntary team member.

There are many faculty and senior staff interested in the 5 technical disciplines (water, sanitation, energy, health, agriculture) and issues of Sustainability in a development context at MIT. During this quarter, we approached many of these people and asked them to be "CITE Sustainability Advisors," which provides an opportunity for them to be involved in the CITE project at a low level of effort and also provide

CITE researchers and fellows access to subject matter experts in the technical disciplines. The following individuals have agreed to serve as CITE Sustainability Advisors:

- Stephen Connors, Regional Energy Alternatives Director, MIT Energy Initiative
- Prof. Gabriella Carolini, Assistant Professor, Department of Urban Studies and Planning, MIT
- Prof. Stan Finkelstein, Senior Research Scientist, Engineering Systems Division and Harvard-MIT Division of Health Sciences & Technology and Associate Professor of Medicine, Harvard Medical School
- Myra Foster, Public Health Promotion Specialist, Oxfam America
- Prof. Richard Larson, Mitsui Professor of Engineering Systems and Director, Center for Engineering Systems Fundamentals, MIT
- Susan Murcott, Senior Lecturer, Civil and Environmental Engineering, MIT
- Kenny Rae, Public Health Engineer, Oxfam America
- Dr. Afreen Siddiqi, Research Scientist, Engineering Systems Division, MIT

In January of 2013, Derek Brine, Associate Director of CITE, and Dan Frey, faculty lead for CITE traveled to Singapore to participate in the Singapore University of Technology and Design Annual Design Summit and to present their draft white paper on technology evaluation. During the trip, Derek met with faculty and researchers at SUTD's Opportunities Lab (O-Lab), with expertise and interest in product evaluation in order to build relationships with like-minded researchers in Southeast Asia. The relationship with SUTD continues to evolve and could result in a hub location.

1.2. Events

In order to better align and coordinate the efforts of CITE, weekly meetings with the program managers and staff have been instituted. In addition, a monthly meeting with all key personnel from the CITE program has been established to track progress of the deliverables as described in CITE'S workplan. Finally, the CITE seminar course, ESD.S20/11.S941 Evaluating Technology for the Developing World meets weekly on Mondays from 3:30 – 5:00. Of note, in class February 19, 2013, Representatives from Oxfam America, Mercy Corps, Kopernik and Partners in Health joined in a panel discussion on products used in their development interventions.

1.3. Publications

CITE Program team is in the process of developing white papers for possible evaluation methodologies for suitability, scalability and sustainability.

1.4. Communications

The following tables highlights where CITE has been featured:

Date	Source	Media	Title/Link
11/8/2012	The Boston Business Journal	eNews	"MIT anti-poverty initiative lands $25 million grant" on November 8, 2012" http://www.bizjournals.com/boston/news/2012/11/08/mit-gets-25m-grant.html
11/8/2012	Boston Herald	Print	"MIT winds USAID award to help developing countries"
11/8/2012	The MIT News	eNews	"Bringing the world to Innovation" http://web.mit.edu/newsoffice/2012/going-inside-d-lab-at-mit-1108.html
11/8/2012	The MIT News	eNews	"MIT a linchpin of major new USAID program: http://web.mit.edu/newsoffice/2012/usaid-grant-technology-for-the-

			poor-1108.html
11/8/2012	e! Science News	eNews	"MIT a linchpin of major new USAID program" http://esciencenews.com/sources/mit.reserach/2012/11/08 mit.a.linchpin.major.news.usaid.program
11/8/2012	Science Magazine	eNews	"A 'DARPA' approach to U.S. foreign aid" http://news.sciencemag.org/scienceinsider/2012/11/a-darpa-approach-to-us-foreign-a.html#.UKPMmNketxc.email
11/9/2012	The Boston Globe	Print and eNews	"MIT wins USAID award to help developing countries" http://www.boston.com/politicalintelligence/2012/11/09/mit-wins-usaid-award-help-developing-countries/iszwXIHqWbShp8cBmtnb1L/story.html
11/13/2012	The Tech	eNews	"$25 million for international development initiatives" http://tech.mit.edu/V132/N53/dlab.html
	MIT campus	Poster	Course advertisement was posted throughout the MIT Campus

Part 2: Description of Key Activities

2.1. Quarter Objectives

Establish a firm Program Management foundation to assist CITE in reporting, recruitment and financial tracking and management.

Objective 1: Develop CITE's Institutional Structure including strong relationships with USAID, the HESN and partner development organizations

Objective 2: Develop and apply the CITE "3-S" evaluation methodology through research involving case studies, courses, fieldwork, analysis and modeling

Objective 3: Build a vibrant academic community (courses, students, faculty and staff) dedicated to technology evaluation for development.

2.2. Summary of Key Activities

As indicated in Part 1.1 Milestones, staff and student recruitment were conducted. The Finance and Program Manger, M&E Coordinator and the Shop Manger were hired to provide programmatic and financial support for CITE. Five graduate research assistant (RA) and one teaching assistant (TA) were hired to support the work of CITE and ESD.S20/11.S941 seminar.

To assist in programmatic management, CITE's first year workplan was development and submitted to USAID for approval; an M&E Plan is being drafted and being reviewed within CITE; and a financial and tracing protocols are being developed. After a discussion with USAID, CITE has modified its budget to align with the yearly workplan (sent in a separate attachment).

The CITE website will be one of the main communication tools that CITE uses to engage the larger development community and to spread the word about its work. MIT's Information Services &

Technology (IST) is working with CITE in developing a website and helping to tender the designers for the website and CITE identity logo.

As mentioned in Part 1.1 Milestones, CITE has also initiated an internship and fellowship program with over 20 applications submitted to date. CITE has also begun the development of an edX course in partnership with the Office of Digital Learning at MIT.

Initiation of the evaluation methodology development is underway with the commencement of ESD.S20/11.S941 seminar, with 24 students attending. This course focuses on working within the constraints and problems faced by development agencies, governments, NGOs, and entrepreneurs. Specifically, students will be expected to develop evaluation plans for several products, each identified by CITE's organizational partners (USAID, Partners in Health, Mercy Corps, Oxfam America, UNICEF, WFP and International Rescue Committee and Kopernik). Each student team will complete a 3S (Suitability, Scalability, Sustainability) evaluation design for a product during the semester and will present their findings and proposed refinements of the methodology in midterm and final presentations.

The Suitability team has begun by starting a catalog which now includes over 150 products designed for the developing world. Data in the catalog includes the name of the product, the manufacturer, technical specifications and any technical performance data that can be found. These products will be parsed into the different typologies developed in conjunction with the sustainability team and further data is now being added by the scalability team on sourcing and manufacturing. This catalog will form the basis of data for the CITE website and a main way for practitioners to interact with CITE in the future. It is our hope to move forward with a consumer reports type deliverable in addition to a detailed evaluation of one line of products this summer.

Further, the suitability team has started work on a tool to rank and select products for evaluation based on several different methods used in industry and in product design, modifying it to include issues related to scalability and sustainability in conjunction and coordinate with CITE's other internal groups. We plan to test this method during the summer of 2013, hopefully with USAID in Washington.

The Sustainability Team conducted numerous design sessions over the course of Quarter 2 to developing a framework for the evaluation methodology. Typically, Sustainability is defined along the three major dimensions of Social, Economic and Environmental. For CITE, since we are specifically interested in the Sustainability of development technologies, a fourth dimension of Technical was added to the framework.

Increasing the community of practice around technology evaluation at MIT has the potential to add to CITE's ability to achieve scale and impact. CITE management has been reaching out to a select number of MIT faculty to involve them in the development of the CITE methodology and development organizations on campus as part of student recruitment for summer fellowships and internships.

Part 3: Intra-Development Lab/University Engagement

3.1. Interdisciplinary Collaboration

As highlighted in Part 1.1, collaboration has been initiated with the MIT Public Service Center (PSC) to create CITE-PSC internships and fellowships. The USAID Community Partner Interns are graduate or undergraduate students who will serve as summer interns with CITE partner organizations, such as USAID, Mercy Corps, UNICEF, Oxfam America and Kopernik. Cambridge-Boston paid internships may

be full-time or part-time for 4-12 weeks during the summer. The work will provide support for CITE's organizational partners in Indonesia and elsewhere. Full-time internships for 4-10 weeks are also available in Indonesia, Washington DC and possibly at USAID field missions in Africa and Southeast Asia. Travel, accommodations, and living expenses will be covered through an internship stipend. The USAID Program Development Fellowship will offer graduate and undergraduate students the chance to become part of the CITE program development team. Students will work on campus with CITE staff and faculty to develop and implement programming that engages MIT students and others in CITE's work, which may include a conference, lectures, web site, and more. The Fellowships offer an hourly stipend for part-time or full-time summer work (10-40 hours/week). A call for application has been submitted and over 20 applicants have applied to date. Students will be selected by the end of April and fellowships and internships will begin in late May or early June.

The Sustainability Team is also involved with LAUNCH Initiative, which is under contract to NASA (Department of Aeronautics and Astronautics, MIT) and NIKE (Sloan School of Management, MIT).

As mentioned in Part 1.1, the Sustainability Team has created an "CITE Sustainability Advisors" from multiple departments, Initiative and Centers: MIT Energy Initiative, Department of Urban Studies and Planning, Center for Engineering Systems Fundamentals, Engineering Systems Division, Harvard-MIT Division of Health Sciences & Technology, Civil and Environmental Engineering, and representatives from Oxfam America.

3.2. Partner Engagement

CITE has engaged its partners through the CITE Seminar course. In particular, on February 19, 2012, representatives from Oxfam America, Mercy Corps, Kopernik and Partners in Health joined in a panel discussion on products used in their development interventions. Each partner has been paired with a team of students to create an evaluation protocol for a product with which the organization is currently grappling. The four partners and the products they have selected include:

Partner	**Product**	**Location**
Kopernik	Biomass Cookstove	Indonesia
Kopernik	Nazava Water Filter	Indonesia
Mercy Corps	Tofu Vacuum Cooker	Indonesia
Oxfam America	DelAgua Water Testing Kit	Senegal/Various
Partners In Health	Medical Waste Incinerators	Haiti

The students have been working closely with each of the partners and meet with headquarters and/or field staff on a regular basis.

As mentioned in Part 1.1 and 3.1, two members from Oxfam America have joined the "CITE Sustainability Advisors" team.

3.3. Student Engagement

As mentioned in Part 1.1, ESD.S20/11.S941: Evaluating Technologies for the Developing World, a weekly seminar commenced with 15 registered students and 9 non-registered students in attendance. The course consists of a series of lectures, discussions and presentations by MIT faculty and staff, CITE's partners and the students themselves, each designed to build upon the CITE evaluation method or to

provide practical context and background for MIT researchers. In addition CITE has benefitted extraordinarily by having Dr. Jeffrey Asher, Former Technical Director and Vice President of Consumer Reports, as an advisor to the class and the teams.

Students in the course will work with MIT faculty and staff to generate an initial 3S evaluation methodology and gather, organize and present a database of products designed for the developing world. Additionally, each student team in the course will be responsible for developing an in-depth evaluation proposal for a product or technology identified in collaboration with one of CITE's partners. The students will work with those partners to map their product evaluation needs and appropriately scope an evaluation project for summer 2013. The most promising and well-defined evaluation proposals will be funded for field research starting June 2013, and the most promising students may be selected for research assistantships for the fall of 2013. Further a partnership with PSC has been established to increase the number of student involvement with CITE through the previously mentioned internship and fellowship programs.

3.4. Lessons Learned/ Good Practices

Involving our partners in a substantive way (i.e. by having them engaged in student projects and by hosting interns in the summer) has been pivotal in investing those organizations in our efforts.

It is extremely important to engage students early. The timing of the award made it difficult to recruit students and research assistants for the spring of 2013. At MIT most graduate students already have funding for the year by the September/October, as such we should be in a better position to recruit students in year 2.

Part 4: USAID Engagement

4.1. Interactions

Weekly phone call with USAID/OST/HESN AOR, Dr. Ticora Jones has been instituted to help guide CITE faculty with the initial implementation of CITE and aligning CITE's objectives with HESN's results framework. To supplement this weekly guidance, a lengthy phone conversation was conducted with MIT (CITE, IDIN, OSP), USAID's Office of Acquisition and Assistance (OAA) officer, Mr. Roderick Watson, and USAID/OST/HESN representative Ms. Michelle L'Archeveque on March 21, 2013. Previously submitted questions regarding contracting and budget were addressed, and outstanding questions were recorded for OAA and HESN to answer at a later date.

Multiple phone conversations have been exchanged with Mr. Armand Lanier, Senior Regional Development Advisor USAID/IDEA/DIV and the CITE Team to create a linkage and support from USAID's Development Innovation Ventures. We believe this partnership should result in a summer project with a DIV partern in 2013. In addition, the Sustainability Team has been conversing with Mr. Will Schmitt, USAID/OST regarding the LAUNCH Initiative.

In preparation for the April HESN Lab Directors Convening, key USAID personnel have been identified and contacted to establish side meetings to create linkages and explore collaboration especially with Development Innovation Ventures (Armand Lanier) and with various Grand Challenge teams (Ku McMahan and Karen Clune)

4.2. Lessons Learned/ Good Practices

The space that the CITE team has been given to engage with and explore opportunities with USAID staff has been invaluable in identifying possible collaborative opportunities. Our researchers are responsive to this type of latitude and are happy to be working closely with USAID staff. In practice, spontaneous network forming is a good pathway to successful relationship building.

Part 5: Collaboration with Other Development Labs

5.1. Interactions

During the April Lab Director's meeting initial contacts were made with MSU, Duke, Berkeley and Makerere University. These discussions continue and formal steps to solidify partnerships will be taken once synergies have been identified.

5.2. Lessons Learned/ Good Practices

Face to face meetings are essential to understanding the missions and expertise of each individual lab.

Due to the time and effort involved in coordinating activities, establishing only one or two high-value, productive linkages for each lab should be a priority.

Part 6: Monitoring & Evaluation

6.1. Preparation Activities

As highlighted in Part 1.1, a Monitoring and Evaluation Coordinator, Ms. Kendra Leith was hired during Quarter 2. Further, the initial set of indicators for the CITE program that corresponds to the objectives and intermediate results of the HESN Results Framework have been developed to date. In addition, an M&E strategy has been developed with internal deadlines for completing the monitoring and evaluation plan over the next nine weeks. We will present the initial plan on May 24th during the CITE retreat and gather feedback. After making revisions, we will send out a complete draft to the CITE team for final comments on June 15th.

6.2. Ongoing Monitoring & Evaluation

The CITE Program is in the process of integrating its objectives, intermediate results and programmatic indicators in to the HESN Results Framework.

Part 7: Looking Ahead

7.1. Calendar of Events

APRIL 2013				
DATES	**EVENT**	**DESCRIPTION**	**USAID Leadership/ Involvement**	**Development Lab Collaboration**
April 1-3	USAID Lab Director Convening	Meeting of and networking with all HESN Labs and suitable USAID Bureaus and Centers	USAID/OST staff, other USAID bureaus and centers	
April 13	International Development Night (IDNight)	An mini-conference and social event where interested students and community who are interested in international development can build relationship with MIT programs and student organizations		
April 22	ESD.S20/11.S941 Class: USAID Panel	The Higher Education Solutions Network and the Importance of CITE	Dr. Ticora Jones, USAID/OST, Dr. Lanakila Ku McMahan, USAID/OST Tony, USAID Karen Clune, USAID/GH	
MAY 2013				
DATES	**EVENT**	**DESCRIPTION**	**USAID Leadership/ Involvement**	**Development Lab Collaboration**
May 13-14	USAID-MIT High Level Meeting	Dr. Alex Dehgan and Dr. Ticora Jones visit to MIT: meetings with MIT President, Provost, Chancellor, Dean, Public Service Center, Resource Development, CITE and IDIN key personnel	Dr. Alex Dehgan, USAID/OST Dr. Ticora Jones, USAID/OST	
TBD	Travel to USAID	Student and Faculty/staff travel to USAID to present work from ESD.S20/11.S941 seminar.	USAID/OST/HESN	
Late May	Visit from MSU	Ajit Srivastava will make a trip to MIT to discuss possible collaboration opportunities between MIT and MSU.		MSU

JUNE 2013				
DATES	**EVENT**	**DESCRIPTION**	**USAID Leadership/ Involvement**	**Development Lab Collaboration**
TBD	Student and Faculty field travel (to extend until August)	Travel to partner location (Singapore, Indonesia, Uganda, etc.) for students to conduct research, evaluate products, create case studies, etc..	USAID is requested to assist in finding student intern placements at USAID field missions. CITE requests that USAID missions be made aware of CITE interns in country placed with other organizations and to look for possible areas for collaboration.	
JULY 2013				
DATES	**EVENT**	**DESCRIPTION**	**USAID Leadership/ Involvement**	**Development Lab Collaboration**
AUGUST 2013				
DATES	**EVENT**	**DESCRIPTION**	**USAID Leadership/ Involvement**	
SEPTEMBER 2013				
DATES	**EVENT**	**DESCRIPTION**	**USAID Leadership/ Involvement**	

7.2. Description of Future Activities

7.2.1. Milestones

Quarter 3 will prove to be the busiest quarter of Year 1 with preparation of the student internships, fellowships and field studies taking place. There will be approximately 13 students and two faculty/staff traveling abroad in late May or possibly early June, with possible additional support from PSC. The majority of our budget will be spent during this and our final quarter of Year 1.

7.2.2. Events

Six CITE core team members are planning to attend the April HESN Lab Directors Convening from April 1-3, 2013 where we hope to create new partnership and strengthen existing ties with USAID staff and other HESN Lab members.

CITE is scheduled to present a booth at MIT's International Development Night on April 13, 2013, where we hope to recruit additional students for our summer internships and fellowships.

A special call is scheduled on April 22, 2013 with a four-people USAID panel discussion. Two USAID personnel, Dr. Lanakila Ku McMahan and Ms. Karen Clune come to MIT, and Dr. Ticora Jones and Mr. Tony Bloome will attend attending through a live-stream.

A high-level meeting between USAID and MIT is schedule for May 13-14, 2013. Dr. Alex Dehgan, head of Office of Science and Technology and Dr. Ticora Jones, OST/HESN are scheduled to meet with MIT's President Rafel Reif, Dean Daniel Hastings, Prof Kim Vandiver (Egerton Center), Public Service Center Directory Sally Susnowitz, Provost Chris Kaiser, Chancellor Eric Grimson, Vice President Jeff Newton (Resource Development), Vice President Claude Canizares (Global Partnership), and the IDIN and CITE key personnel. In addition the two USAID guest will attend ESD.S20/11.S941 seminar and observed the final class presentations from the students.

7.2.3. Publications

A series of case studies from our interns will be in progress and expected for August 2013, and White papers on each of suitability, scalability and sustainability are currently being drafted for review.

7.2.4. Communications

On May 13, Dr. Alex Dehgan's address at MIT is anticipated to be covered by local news and media.

Part 8: Appendix

Appendix I: CITE Seminar syllabus

ESD.S20/11.S941: Evaluating Technologies for the Developing World Introduction

In partnership with the U.S. Agency for International Development's (USAID) Higher Education Solutions Network (HESN), MIT has established the Comprehensive Initiative on Technology Evaluation (CITE). This seminar will serve as a forum for developing and testing CITE's product evaluation methodologies and for engaging with USAID and other development organizations to refine and later implement those methods.

Led by faculty from Engineering Systems Division and Urban Studies and Planning, this seminar will analyze various evaluation methodologies, incorporating knowledge and techniques from a range of disciplines including Systems Engineering, Institutional Analysis, Experimental Design, Supply Chain Analysis and Community Development. Sessions will explore methods of evaluation from various disciplinary and applied fields to ensure that products designed for international development are suitable, scalable and sustainable. Guest lecturers and panelists include, Dr. Jeffrey Asher, Former Technical Director and Vice President of Consumer Reports and representatives from each of CITE's organizational partners. Dr. Jeffrey Asher will serve as a technical advisor to students and will attend the class regularly.

The course will focus on working within the constraints and problems faced by development agencies, governments, NGOs, and entrepreneurs. Specifically, students will be expected to develop evaluation plans for several products, each identified by CITE's organizational partners (USAID, Partners in Health, Mercy Corps, Oxfam America, UNICEF, WFP and International Rescue Committee and Kopernik). Each student team will complete a 3S (Suitability, Scalability, Sustainability) evaluation for the same product in two separate contexts during the semester and will present their findings and proposed refinements of the methodology in midterm and final presentations. Based on performance in the course there are several ways for interested students to stay involved in the CITE effort including funded research positions.

Course Administration

Professors: Bish Sanyal (sanyal@mit.edu), Oli de Weck (deweck@mit.edu) TA: Stephen Maouyo (maouyo@mit.edu)☐Class site: http://stellar.mit.edu/S/course/ESD/sp13/ESD.S20/☐Schedule: Mondays, 3:30-5:00, Room 4-149

Prerequisites

Students are expected to have an interest in and familiarity with poverty alleviation, international development and/or products intended for the poor. As such, preference will be given to students with either an undergraduate degree in an engineering discipline, OR who have taken ANY of the following courses: Any D-Lab course, 11.005, 11.701, 16.810J, ESD.283, 2.007, 2.009, 14.003. Students may also request permission of the instructors if they meet none of the aforementioned prerequisites.

Class attendance and participation

Attendance in the class sessions will be taken and will count towards the final grade.

In addition, active participation in the class sessions and group project will also count towards the final grade. The participation grade will be based on:

1. Active participation in class discussions.

2. Team member (peer) evaluations.

This course is an opportunity to actively engage in a new research initiative at MIT funded by USAID. As such, course lectures and the work that follows are critical for successful development of the CITE research program. It is our hope that students who enroll in the course will become long-term participants with CITE.

Student Team Project

The principal student deliverable for this course is a two part group project. CITE's organizational partners have each proposed one or more products that they would like evaluated that will form the basis of this group project during the semester. On or before February 25th, students will rank order the potential products on which they would like to work, and be divided into project teams.

Each team will be assigned one product and receive background information regarding the product, including the sponsoring partner and two contexts in which the product has been or will be deployed. In class sessions three, four, and five, students will be introduced to the 3-S (Suitability, Scalability, and Sustainability) evaluation framework. Each team will choose one of the two provided contexts and use the week following those sessions to perform a preliminary evaluation of their product with respect to the 3-S topic presented that week. In completing their preliminary assessment, the teams are expected to consult with both the faculty presenters and partners on each segment of evaluation. On April 1st, each student team will make a brief, integrated presentation on the assessments that they have completed that highlights the results of their evaluation, their proposed changes to the evaluation method and the overlaps between the 3S's.

During the remainder of the semester, teams will be expected to integrate the methodologies discussed and developed in the class sessions into a Product Evaluation Plan for their product within the second context provided by their development organization partner. The Product Evaluation Plan will consist of:

1. Research on:

a. The problem which the product addresses

b. The context/country/region/marketplace in which the product will be ☐employed (social context, cultural context, environmental context)

c. The product model(s) to be evaluated

2. Proposed evaluation methodology

3. Proposed testing to be completed with approximate costs, timeline, resources ☐required and any technical drawings

4. Proposed field testing sites and partnering plans with the local USAID mission and ☐CITE organizational partner (including contacts).

5. As applicable, any preliminary 'proof of methodology' testing

Teams will submit a final Product Evaluation Plan of no more than 30 pages (excluding appendices which may include draft interviews and surveys, results of interviews, physical test rig designs, supply chain maps, sustainability rating procedures, etc). Teams will present their plans to faculty, staff, classmates and development organization partners during an extended class session on May 13th (3:30pm – 6:30pm)

Meetings, Management and Resources

Each team will work with the course faculty and staff to develop their work and starting the week of February 25th) will schedule four one hour meeting times outside of class with their respective CITE organizational partner, the first of which should take place between February 25th and March 1st. The remaining three meetings will take place (1) after the preliminary evaluation; (2) during the creation of the Product Evaluation Plan; and (3) within the week preceding final presentations. The team's discussion will include reviewing progress, gathering information, allocating work, setting goals and communicating major issues or roadblocks. Outside of this meeting, the team will also be expected to independently consult with the faculty and staff from each of the 3S areas to develop their plan.

The D-Lab shop and shop Manager, Jack Whipple, will be available to students in the course for thinking through physical testing apparatus design (and possible construction). In addition, each student team will receive a small budget to cover testing materials and setups required to complete their preliminary methodological proof testing work, as needed.

Final Presentations

The May 13th class will be public sessions attended by CITE's organizational partners and members of the MIT community during which student teams present their Project Evaluation Plans.

Readings

Readings for each week will be posted to the course site. Students are expected to have read and be prepared to discuss readings for each week before coming to class. New readings, supplied by faculty, partners, as well as students themselves, will be added to the resource base for the CITE initiative throughout the semester. A partial reading list can be found below.

Exams

There will be no exams in the course.

Grading

Attendance 10% Participation 10%

3S Assignments 15% Product Evaluation Plan 40% Final Presentation 25%

Detailed Schedule

Session 1	February 11th	*Course Overview and Introduction to the USAID Higher Education Solutions Network (HESN)and the Comprehensive Initiative on Technology Evaluation (CITE)* Speakers: Profs. Bish Sanyal and Oli De Weck *Adapting the Consumer Reports Method to Emerging Countries* Guest Speaker: Dr. Jeff Asher, Former Technical Director and Vice President of Consumer Reports
Session 2	February 19th	*NGO Panel: Challenges in Product Deployment* Moderator: TBA Speakers: TBA

Session 3	February 25th	*Scalability: What is it? What methodologies would be appropriate to evaluate scalability?* Speakers: Prof. Steve Graves; Dr. Jarrod Goentzel, Director, MIT Humanitarian Response Lab **Student teams formed and posted**
Session 4	March 4th	*Suitability: What is it? How do we measure it? What methodology do we propose?* Speakers: Prof. Dan Frey; Prof. Amos Winter; Derek Brine, Program Manager, CITE
Session 5	March 11th	*Sustainability: How do you create technologies that are sustainable? What are the barriers to sustainability? How can they be evaluated?* Speakers: Prof. Oli de Weck; Jennifer Green, Research Scientist, SSRC **Scalability Assessment Due**
Session 6	March 18th	*What will it take to scale and institutionalize assessment of products for international development?* Guest Speakers: Dr. Jeff Asher, Consumer Reports; Noha El-Ghobashy, Iana Aranda, Engineering for Change **Suitability Assessment Due**
Session 7	April 1st	*How can we integrate the 3S methodology?* Student, Faculty and Staff discussion and reflection. **Sustainability Assessment Due**
Session 8	April 8th	**Mid Term Presentations**
Session 9	April 22nd	*The Higher Education Solutions Network and the Importance of CITE* Speaker: Dr. Ticora Jones, USAID
Session 10	April 29th	*CITE and Development Practioners* Speaker: Prof. Bish Sanyal **5 Minute Group Updates**
Session 11	May 6th	*MIT's International Development Ecosystem* Speakers: J-Pal, Tata, Legatum Center, Public Service Center, Others

Session 12	May 13th 3:30pm – 6:00pm (Extended Session)	Public Event: Group Project Presentations

Reading List

Introduction

"Consumer Reports: How We Test." *Consumer Reports Testing*. N.p., n.d. Web. <http://www.consumerreports.org/cro/about-us/whats-behind-the- ratings/testing/index.htm>.

Smillie, Ian. *Mastering the Machine Revisited: Poverty, Aid and Technology*. London: ITDG Pub., 2000. 69-103.

Suitability

Bilger, Burkhard. "Hearth Surgery." *The New Yorker* 21 Dec. 2009: 84-97.☐Garvin, David A. "What Does 'Product Quality' Really Mean?" *Sloan Management Review*

26.1 (1984): 25-43.

Griffin, Abbie and Albert L. Page. "PDMA success measurement project: Recommended measures for product development success and failure." *Journal of Product Innovation Management* 13.6 (1996): 478-496.

Henard, David H. and David M. Szymanski. "Why Some New Products Are More Successful Than Others." *Journal of Marketing Research* 38 (2001): 362-75.

Stellar, Daniel. "The PlayPump: What Went Wrong?" *State of the Planet*. The Earth Institute, 1 July 2010. Web. <http://blogs.ei.columbia.edu/2010/07/01/the-playpump-what- went-wrong/>.

Sustainability

The 2011 CSO Sustainability Index for Sub-Saharan Africa. Washington, D.C.: United States Agency for International Development, 2011.

Anand, Sudhir, and Amartya Sen. "Human Development and Economic Sustainability." *World Development* 28.12 (2000): 2029-049.

Andreas, Georgoulias, Jill Allen, Libby Farley, John Kher Kao, and Irina Mladenova. "Towards the Development of a Rating System for Sustainable Infrastructure: A Checklist or a Decision-Making Tool?" *Proceedings of the Water Environment Federation*. 2 (2010): 379-91.

Arrow, K. J., Partha Dasgupta, Lawrence H. Goulder, Kevin J. Mumford, and Kirsten Oleson. "Sustainability and the Measurement of Wealth." (No. w16599). National Bureau of Economic Research, 2010.

Human Development Report 2011: Sustainability and Equity-A Better Future for All. New York: United Nations Development Programme, 2011.

The Changing Wealth of Nations. Washington, D.C.: World Bank, 2011.☐Singh, Rajesh Kumar, H. R. Murty, S. K. Gupta, and A. K. Dikshit. "An Overview of

Sustainability Assessment Methodologies." *Ecological Indicators* 9 (2009): 189-212. **Scalability**

Goentzel, Jarrod, Erin Sullivan, and Rebecca Weintraub. "The Global Health Supply Chain." *Cases in Global Health Delivery* (2011): Harvard Business Publishing.

Shook, John, and Mike Rother. *Learning to See: Value Stream Mapping to Create Value and Eliminate Muda*. Brookline: Lean Enterprise Institute, 1999.

Appendix II: Membership in ESD/S20.11.S940

Name	Registration Status	Block	Visible
Al-Haque, Shahed	Non-Registered	n/a	No
Asher, Jeffrey	Non-Registered	n/a	No
Beane, George Holton	**Registered**	Block	No
Bedri, Hisham	**Registered**	Block	No
Beeler, Michael Francis	Non-Registered	n/a	No
Cardoso, Cauam Ferreira	**Registered**	Block	No
Chen, Annie	**Registered**	Block	No
Do, Sydney	**Registered**	Block	No
Edwards, Morgan Rae	**Registered**	Block	No
Gautam, Sanjay Kumar	**Registered**	Block	No
Gorbaty, Emily	**Registered**	Block	No
Grau Serrat, Victor	Non-Registered	n/a	No
Ho, Alan	**Registered**	Block	No
Ho, Koki	Non-Registered	n/a	No
Jeunnette, Mark N	**Registered**	Block	No
Kerdpairoj, Prad	Non-Registered	n/a	No
Markgraf, Claire	**Registered**	Block	No
Mkrtchyan, Armen	**Registered**	Block	No
Skot, Tessa	**Registered**	Block	No
Spielberg, Jonars	Non-Registered	n/a	No
User, Provisional	Non-Registered	n/a	No
Willemann, Simmy	**Registered**	Block	No
Yap, Nicole	**Registered**	Block	No
Yow, Wei Quin	Non-Registered	n/a	No

APPENDIX III

Research Assistant: Master Level Spring 2013

Reports to: CITE Suitability Lead

Candidate: Ellen Chen

Duties:

1. Through MIT Libraries, go through the list of journals listed below* and search for articles within that are the pertinent to the following topics. The most relevant journals below are bolded:
    a. Consumer product evaluation methods and approaches
    b. Engineering design and testing in the developing world Soliciting expert opinion (For technology review purposes)
    c. Technology evaluation methods

    Searches will be specifically noted between "product" and "technology". A product embodies a technology. i.e. Batteries (product) contain lithium ion technology or semiconductor technology is used in microprocessors (product) etc.)

2. Create a ranked bank of articles and an annotated bibliography of *at least* the top 20 papers you find. Pay attention to references and make sure to cover any seminal works.

3. Write and publish the following series of papers in collaboration with CITE Suitability personnel:
    a. *Product Evaluation: Methods and Approaches from Across Disciplines* (ready for submission sometime in the fall)

        A literature review paper that examines how products and technology are evaluated and selected in medicine, automotive, aerospace, consumer product arenas etc (don't limit to just these if there are better examples).

    b. *Applying Product Evaluation in The Developing World* (Ideas paper based on literature review, ready for submission sometime in the spring)

        This paper describes the state of the art in product evaluation and proposes ways forward in investigating how to modify the most promising methods to suit conditions found in the developing world. Proposes what a possible product evaluation scheme would look like for a low-resourced environment in which an RCT or other resource intensive and time intensive method would not be appropriate or warranted. Takes the consumer and the practitioner's point of view in terms of evaluation; incremental rather than comprehensive.

Skills and Experience:

1. Master's level coursework in engineering, planning, international development or a related field.

2. Interest in products and technology for the developing work.
3. Experience and interest in research and academic writing.

This position is a full time (20 hours/week) position running from January 2013 to May 2013 and requires a total commitment of 360 hours.

<u>* Journal List</u>
Journal of Applied Psychology
World Development
Journal of Experimental Social Psychology
Technological Forecasting and Social Change
Journal of Development Studies
Trends in Cognitive Science
Fuzzy Optimization and Decision Making
Decision Support Systems
Technology Analysis and Strategic management
American Journal of Evaluation
Evaluation Review
International Development Planning Review
Journal of international Development
Studies in Comparative international Development
International Journal of Forecasting
Journal of Forecasting
Journal of Economic Surveys
Survey Methodology
Sustainable Development
International Journal of Design
Journal of Engineering Design
Research in Engineering Design
Development
Third World Quarterly
Emerging Markets Review
Psychology and marketing
Journal of Product Innovation Management
Journal of Consumer Research
Journal of Consumer Culture
International Journal of Consumer Studies

APPENDIX IV:

Job Descriptions for Sustainability RA

Research Assistant I (Masters Level)

Reports to: CITE Project Manager for Sustainability

The ideal candidate will have (i) a strong background in social or economic studies and an interest in sustainability, (ii) strong writing skills and a willingness to learn new tools (iii) be able to work both independently and in small team settings, (iv) be willing to travel for up to 2 months in developing countries, and (v) have a long-term interest in working in international development and improving the lives of those living in poverty. Prior research assistant experience is preferred. Excellent grades are required.

Duties:

1. Work together with other CITE Sustainability Core Team members and Advisors as part of a tightly knit multi-disciplinary group
2. Perform desk reviews of Agriculture technologies used in developing countries and create case studies of Agriculture project implementation
3. Identify key drivers and assessment methodologies for Sustainability in the Economics dimension.
4. Conduct detailed test & evaluation of Agriculture technologies, including design of appropriate qualitative and quantitative analysis methods
5. Develop Terms of Reference (ToR) for USAID & other Partner Organizations for field work, as appropriate
6. Analyze data gathered in field and write Technology Evaluation Reports
7. Interface with UN/NGOs, USAID and Higher Education Solution Network (HESN) partners, especially in areas related to Agriculture
8. Plan and participate in CITE Seminar courses and student-led research initiatives at MIT
9. Plan and participate in networking events with other HESN universities
10. Support international and domestic travel to attend meetings, conduct field-based research and attend conferences, as appropriate
11. Publish articles in conference proceedings

Required Skills:

1. Bachelor's degree in Economics or International Relations
2. Strong interpersonal skills, flexibility, resourcefulness, and the ability to work well in a team environment are critical.

Current Status:

- Position currently filled by Tessa Skot (January 2013 – May 2014).